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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/961,208	09/24/2001	Takashi Imamura	Q66342	6241

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SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC  
2100 Pennsylvania Avenue, N.W.  
Washington, DC 20037-3202

EXAMINER
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KRONENTHAL, CRAIG W

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/961,208

Applicant(s)

IMAMURA ET AL.

Examiner

Craig W Kronenthal

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 24 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1/11/02, 9/24/01.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 7, 8, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Katsuragawa et al (P.N. 5,319,549). (hereinafter Katsuragawa)

Regarding Claim 1: Katsuragawa discloses a method of detecting an abnormal pattern candidate, in which a microcalcification pattern candidate embedded in an object image is detected as an abnormal pattern candidate and in accordance with image information representing the object image, the method comprising the steps of:

- Performing processing, in which a first shape-dependent filter (26) in accordance with a shape of microcalcification pattern is utilized, on the object image, a fine structure image, which illustrates a fine structure area embedded in the object image, being thereby formed, (col. 5 lines 27-30)
- Performing enhancement processing, in which a second shape-dependent filter (23) in accordance with the shape of the microcalcification pattern is utilized, on the fine structure image, an enhancement-processed image, in which the microcalcification pattern has been enhanced, being thereby formed, (col. 5 lines 35-38)

- Detecting the microcalcification pattern candidate by use of the enhancement-processed image (step 407, col. 6 lines 61-63)

Katsuragawa explains that "lump and linear opacities of interstitial infiltrates are identified from two processed images which are obtained by using a morphological filter and a line enhancement filter" (col. 5 lines 57-60). Interstitial infiltrates is understood to be synonymous with microcalcification.

Regarding Claim 7: Katsuragawa discloses the method in claim 1 wherein the first shape-dependent filter is a morphological filter (26, col. 2 lines 32-36).

Regarding Claim 8: The same reasons for rejection apply for this claim as in claim 1 above.

Regarding Claim 14: Katsuragawa discloses the method in claim 8 wherein the first shape-dependent filter is a morphological filter (26, col. 2 lines 32-36).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsuragawa in view of Takeo et al. (P.N. 5,714,764). (hereinafter Takeo)

Regarding Claim 2: Image recording conditions yield corresponding read-out conditions such as sensitivity and latitude. Therefore, the argument below regarding claim 3 also holds for the image recording conditions.

Regarding Claim 3: Katsuragawa discloses the method as defined in claim 1 for reasons explained above, but does not disclose the following, which is instead disclosed by Takeo:

- A plurality of second shape-dependent filters, which conform to different read-out conditions at the time of object image acquisition, are prepared for the respective read-out conditions,

Takeo describes the creation of a conversion table, which holds read-out conditions such as sensitivity and latitude (col. 12 lines 5-8)

- A second shape-dependent filter, which conforms to the read-out conditions of the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared,

Takeo explains that the conversion process involves a filter, which utilizes the above mentioned conversion table (col. 12 lines 9-16).

- The enhancement processing is performed by use of the thus selected second shape-dependent filter (col. 11 lines 29-39). The read-out conditions are adjusted to aid in the enhancement of an image. Therefore it is understood that the conversion process is an enhancement process.

One skilled in the art would be motivated to modify Katsuragawa with the teachings of Takeo to create a more specialized filtering procedure so that abnormal regions may be more accurately detected with fewer false-positives.

Regarding Claim 10: The same reasons for rejection apply for this claim as in claim 3 above.

Regarding Claim 9: The same reasons for rejection apply for this claim as in claim 2 above.

5. Claims 4, 5, 6, 11, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsuragawa in view of Doi et al. (P.N. 4,907,156). (hereinafter Doi)

Regarding Claim 4: Katsuragawa discloses the method as defined in claim 1 for reasons explained above, but does not disclose the following, which is instead disclosed by Doi:

- A plurality of second shape-dependent filters, which conform to different contrasts of microcalcification patterns embedded in object images, are prepared for the respective contrasts,

Doi explains that multiple matched filters are created with Fourier spectrums proportional to simulated nodules of a given size and contrast (col. 5 lines 8-10). It should be noted that the SNR-maximizing filter used by Doi enhances the microcalcification or abnormal regions (col. 4 lines 62-65).

- A second shape-dependent filter, which conforms to the contrast of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared,

Doi cites an example in which a matched filter is chosen partially because it conforms to the contrast of a microcalcification pattern embedded in an image (col. 5 lines 15-28).

- The enhancement processing is performed by use of the thus selected second shape-dependent filter. (col 5 lines 26-28)

One skilled in the art would be motivated to modify Katsuragawa with the teachings of Doi to create a more specialized filtering procedure so that abnormal regions may be more accurately detected with fewer false-positives.

Regarding Claim 5: Katsuragawa discloses the method as defined in claim 1 for reasons explained above, but does not disclose the following, which is instead disclosed by Doi:

- A plurality of second shape-dependent filters, which conform to different sizes of microcalcification patterns embedded in object images, are prepared for the respective sizes,

According to Doi, "it is necessary to find a few matched filters, or perhaps just one, which will enhance, to some degree, nodules of various sizes and shapes" (col 5 lines 4-6). Doi explains that multiple matched filters are created with Fourier spectrums proportional to simulated nodules of a given size and contrast (col. 5 lines 8-10). It should be noted that the SNR-maximizing filter used by Doi enhances the microcalcification or abnormal regions (col. 4 lines 62-65).

- A second shape-dependent filter, which conforms to the size of the microcalcification pattern embedded in the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared,

Doi cites an example in which a matched filter is chosen partially because it conforms to the size of a 9mm nodule embedded in an image (col. 5 lines 15-28).

- The enhancement processing is performed by use of the thus selected second shape-dependent filter. (col 5 lines 26-28)

One skilled in the art would be motivated to modify Katsuragawa with the teachings of Doi to create a more specialized filtering procedure so that abnormal regions may be more accurately detected with fewer false-positives.



Regarding Claim 6: Katsuragawa discloses the method as defined in claim 1 for reasons explained above, but does not disclose the following, which is instead disclosed by Doi:

- A plurality of second shape-dependent filters, which conform to different combinations of image recording conditions at the time of object image acquisition, read-out conditions at the time of object image acquisition, contrasts of microcalcification patterns embedded in object images, and sizes of microcalcification patterns embedded in object images, are prepared for the respective combinations,

According to Doi, "it is necessary to find a few matched filters, or perhaps just one, which will enhance, to some degree, nodules of various sizes and shapes" (col 5 lines 4-6). Doi explains that multiple matched filters are created with Fourier spectrums proportional to simulated nodules of a given size and contrast (col. 5 lines 8-10). These matched filters represent combinations of size and contrast, but it is obvious that filters of other combinations could be created. It should be noted that the SNR-maximizing filter used by Doi enhances the microcalcification or abnormal regions (col. 4 lines 62-65).

- A second shape-dependent filter, which conforms to the combination with respect to the object image to be processed, is selected from the plurality of the second shape-dependent filters having been prepared,

Doi cites an example in which a matched filter conforming to a 9 mm nodule is chosen because it provides the best balance of size and contrast (col. 5 lines 15-28).

- The enhancement processing is performed by use of the thus selected second shape-dependent filter. (col 5 lines 26-28)

One skilled in the art would be motivated to modify Katsuragawa with the teachings of Doi to create a more specialized filtering procedure so that abnormal regions may be more accurately detected with fewer false-positives. It is also obvious to one skilled in the art of filtering that a greater number of filter combinations available, allows for greater customization and therefore more accurate results.

Regarding Claim 11: The same reasons for rejection apply for this claim as in claim 4 above.

Regarding Claim 12: The same reasons for rejection apply for this claim as in claim 5 above.

Regarding Claim 13: The same reasons for rejection apply for this claim as in claim 6 above.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

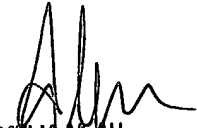
- Nakajima (P.N. 5,583,346) is cited for teaching a method involving several filtering processes for detecting abnormal patterns in medical images.
- Kido et al. (P.N. 5,561,724) is cited for teaching the use of read-out conditions in filtering images.
- Nishikawa et al. (P.N. 5,598,481) is cited for teaching image enhancement in a computer-aided method for diagnosis in mammography.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig W Kronenthal whose telephone number is (703) 305-8696. The examiner can normally be reached on 8:00 am - 5:00 pm / Mon. - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 306-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CWK  
09/01/04

  
AMELIA M. AU  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600